

Bibliometric Analysis of Virtual Reality in Tourism and Hospitality

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Abstract: It is experienced that the tourism and hospitality industry has been changing dramatically year by year, not only the crisis of the pandemic outbreak related to the restriction of travelling but also due to novel of technology evolution, including applications of virtual reality. In fact, applying virtual world into business operation to increase customer intention have been paid more attention from practitioners, scholars, and stakeholders. Yet, it is necessary to comprehend this field's trend and its impact on business strategies and the future perspective of applying virtual reality experiences in tourism and the hospitality industry. This study mainly aims to examine the current state of research and trends of virtual reality related-tourism and hospitality studies from the beginning to the outbreak of the pandemic and post-pandemic and discuss them over the period time towards the future perspective of this research. By proposing a bibliometric approach to analyse 1441 studies from Scopus data published over three last decades related to virtual reality experience in tourism and hospitality sector to generalize information associated with research opportunity for future in this area. This study uses a combination of RStudio 2022 and VOSViewer 1.6.18 software to analyse databases that were retrieved from reliable resources and the most signification impact so as to provide a whole picture of virtual reality connecting with the relevant context. With regard to offering information in terms of the volume document of studies, citations, authors, countries, authorship networks, keyword networks and keyword co-occurrences, the relevant research direction in this field as well as the top journals and conferences that have most published in this field by over years. By using bibliometric analysis, this study's result gives an understanding of value information and suggestions by visual overview for future virtual reality studies on the tourism and hospitality context.

Keywords: Virtual reality, Virtual world, Metaverse, Sustainable tourism, Bibliometric analysis

1. Introduction

Technological revolution has been reshaped customer demand in all service sectors. In particular, tourism and hospitality are considered the most influential sectors impacted by change of technology and innovation. In addition, many disadvantages for this industry had been overcome during and post-pandemic situation lead to efficient services, and more value for customer experiences.

Over the years, the development on integration of information and communication technologies (ICT) brings practical applications for multi sector. Virtual reality (VR) is an emerging trend of technology development in related to fulfilling user's experience by connecting user between virtual and real world (Sousa et al., 2022). Users can get more immersive experiences in virtual reality.

Regarding tourism and hospitality context, virtual reality promptly experienced a significant impact in terms of enhancing tourist's satisfaction by providing unique experience with immersion into virtual world and stimulating sensation of experience. Such a virtual environment based on novel technologies drives how tourist demand in before, during and after their experiences is changing quickly (Loureiro et al., 2020). Based on this understanding, virtual reality be used as one of effectiveness tools for promoting destination images. By a wide range of this applications, practitioners with novel options to optimize their business to attract potential customers as much as possible and develop service experience (Wei, 2019). Unlike other marketing tools, virtual reality stimulates tourists to interact with virtual objects and images in physical sensation. This allows visitors to observe various settings from operators regardless of their location, the time of day or other circumstances. It seems like virtual reality and applications related to technologies have been making revolution in association with travel experience and businesses related to tourism and hospitality (Loureiro et al., 2020)

Despite the fact that there is a plethora of research interested in virtual world, metaverse has emerged. Less information and generalization of knowledge of virtual reality in tourism and hospitality literature as well as limitation of scientific information and relevant research review the current state of this trend over the time. Understanding the importance of this trend for future developments. This study provides visual and useful information based on reliable data from Scopus, by bibliometric approach to review existing relevant research so as to understand research trending and flows of knowledge about this field. Specifically, this study identifies

publications, citations, authors and countries that contributed most knowledge base of virtual reality from over the period time. The study also describes the top scientific journals that have most published of virtual reality as well as key topics and collaboration in relation to virtual reality under tourism and hospitality context. By doing so, this study contribute to the existing knowledge on tourism and development for further research about virtual reality in tourism and hospitality industry in the future.

2. Literature Review

Virtual reality is one of the numerous cutting-edge technologies that has been getting more adequate for promotion strategies in tourism and hospitality to enhance tourists' experience. Moreover, its application has been launched in many areas as business (Jolink and Niesten, 2021), education (Connolly, 2005), heritage preservation, archaeology and museum (Goodrick et al., 2004), promotional marketing (Loureiro et al., 2019), entertainment (Kim et al., 2017).

In tourism and hospitality, virtual reality has been adopted as innovation marketing to get value co-creation from customers and stakeholders (Buhalis et al., 2022). Virtual reality allows travelers to have a unique experience thanks to the full immersion and presence provided by VR. In fact, definition of virtual reality is various. This term first appeared from the middle of 1970 by Myron Kruger, who mentioned theoretical understanding between human and computer interface (Williams & Hobson, 1995). By providing a physical senses and immersion in virtual world where tourists might be allowed to visit any physical location despite of protected areas or dangerous site and even though unreal place could be experienced (Loureiro et al., 2020). Virtual reality considered as 3D virtual environment that allows users have a feeling of being in real environment (Guttentag, 2010). Although its characteristics can be defined in many ways. It can be argued that virtual reality re-defined relationship between human and computer in this decade. Despite providing perfect experience for tourist, the acceptance and use of virtual experience depend on the importance of user's perspective. Therefore, it is essential to understand organization's customer segments and how virtual experience could significantly influence customer decision-making.

3. Methodology

This study uses bibliometric approach to examine knowledge structure of virtual reality in tourism, hospitality as well as get more comprehensive of its trending. The combination of RStudio and VOSViewer 1.6.18 was conducted in bibliometric analysis to identify and visualize research opportunities based on keywords, authors, citations, institutions, publications and relevant research of field.

3.1 Search Strategy

This study utilizes quality data from Scopus database. Although both Scopus and Web of Science are the most reliable and high-impact database. Scopus data covers a majority of scientific research considered as the appropriate source for bibliometric analysis and systematic review (Ali et al., 2019; Andreu et al., 2020; Cunill et al., 2019; Mulet-Forteza et al., 2019).

The query words were used to generate the data set following terms within article title, abstract and key words as "Virtual Reality" OR "Metaverse" OR "Augmented Reality" combined with the search field in T&H as "Tourism" OR "Hospitality" OR "Destination" OR "Tourist" OR "Travel". The criteria for selection articles based on research area, type of document and language for publication. The limitation of selected articles was refined by subject included tourism, hospitality, business management and marketing. Documents are not related to articles or conference papers will be eliminated. Data was selected just by English only. No limitation of time period for data selection with the first publication on this field appeared in early of 1992 still this study was performed by November, 2022.

3.2 Process of Data Collection

By using database from Scopus, data collection was prepared according to the procedure Preferred Reporting Items for Systematic Review and Meta-Analyses (Prisma) which was introduced by Moher et al., (2009b). According to Echiochakoui (2020) this method was considered as a common use to conduct bibliometric approach. Prisma method requires 4 steps to select relevant documents from database includes identification, screening, eligibility and inclusion.

Initially, the first search generated 1,441 publications about virtual reality or metaverse or augmented reality related to tourism and hospitality. After narrowing down within scope of this research, elimination of publication year 2023, document type and languages follow up the search strategy. In the eligibility stage, by scanning

manually, publications were removed unrelated to tourism or hospitality research based on its title, abstract and keywords. The final list of 860 publications retrieved and used for further analysis.

To conduct analysis, this data was imported to RStudio to analyze the most influential papers, authors and country. This data also processed using Visualization of Similarities VOS Viewer to visualize the trending topic based on greatest keyword frequency and co-occurrence, author co-citation and co-words.

4. Results

4.1 The Number of Publications and Total Citation by Year

The figure 1 shows the number of published documents linked to this topic during the period time from 1992 to 2022. The number of published studies has increased significantly since 2018 (76 articles) and 2022 (181 articles). Basing on the development of research topic, it is realistic to predict that this research trend will continue in the following decade and the new peaks will be reached in the coming years.

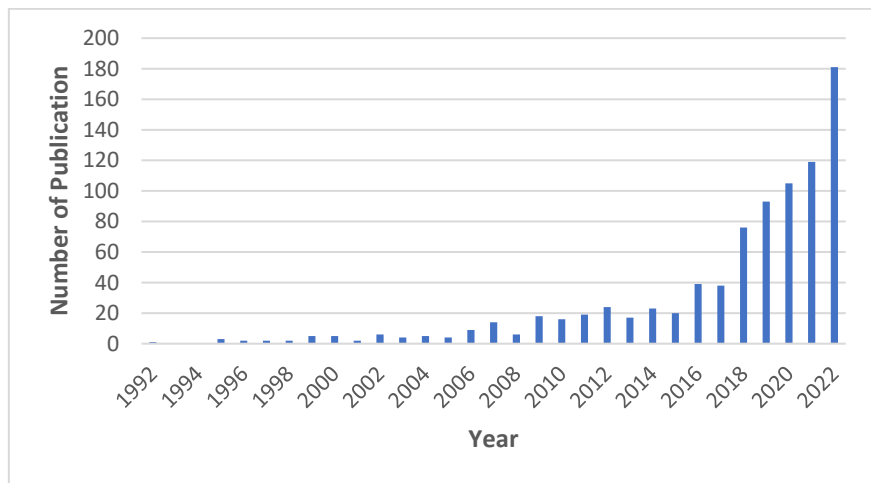


Figure 1: The Number of Publications

The figure 2 depicts the number of publications in comparison with the total citations by year. It can be seen that the number of total citations experienced a significant growth from 2017 period. In particular, the papers published in 2018 received the highest number of citation and the recently papers may receive less number of citation due to short time period.

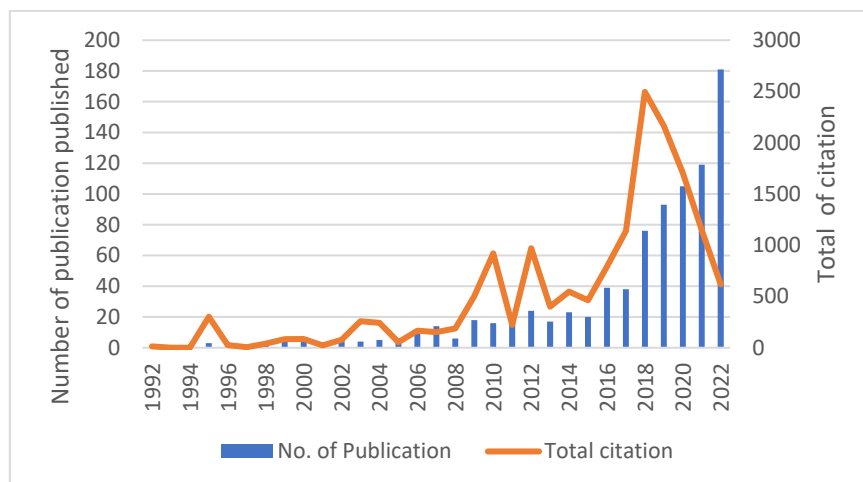


Figure 2: The Number of Publication and Total Citation

4.2 The Number of Publications by Journal and Cited Source Based on References

Regarding the number of virtual reality publications in the selected journals, the fig 3 shows 20 most relevant journals with publications related to field as tourism, hospitality, business, marketing. As can be seen from the fig 3, Sustainability (Switzerland) witnessed a highest number of published articles (36) in association with virtual

reality topic whereas Tourism Management received the most cited source (1380 citations) according to reference lists.

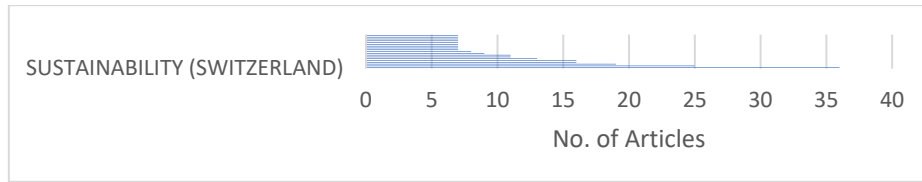


Figure 3: The Most Relevant Source

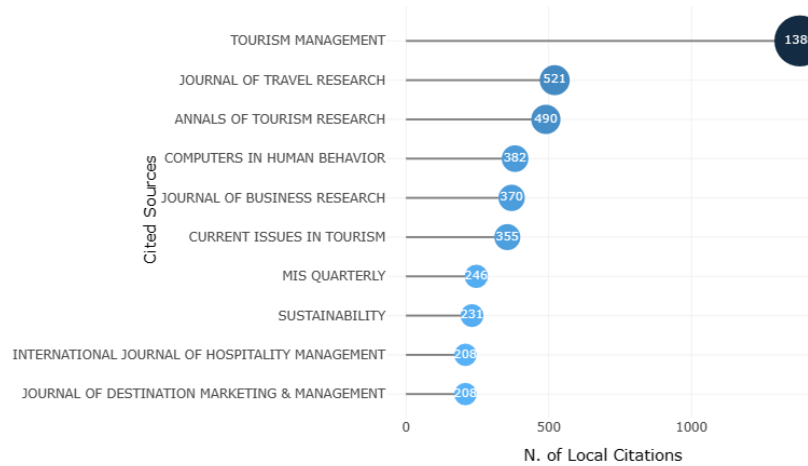


Figure 4: The Number of Local Cited Source (From References List)

4.3 Most Influential Authors and Country

Fig 5 (a Sankey diagram) shows the flows of authors, countries and keywords related to the research topic. This three-field plots brings information on the most productive authors for each country and the research keywords for each country. The left side of the figure illustrates the association between authors and country. For the USA and China, the minority of papers are published by top leading authors whereas United Kingdom and Korea played an influential contribution in term of authors by the country. Mc tom Dieck and Timothy Jung are one of the top leading contributor from Manchester Metropolitan University, followed Namho Chung from Kyung Hee University. It is experienced that Greece, Italy, Indonesia, India where articles are published by non-leading authors in this field. The right side of Sankey diagram depicts the links between country and keywords. As can be seen from the graph, virtual reality is the most topic have been conducted in USA, China, United Kingdom, Australia. Augmented reality is also interested topic by most countries.

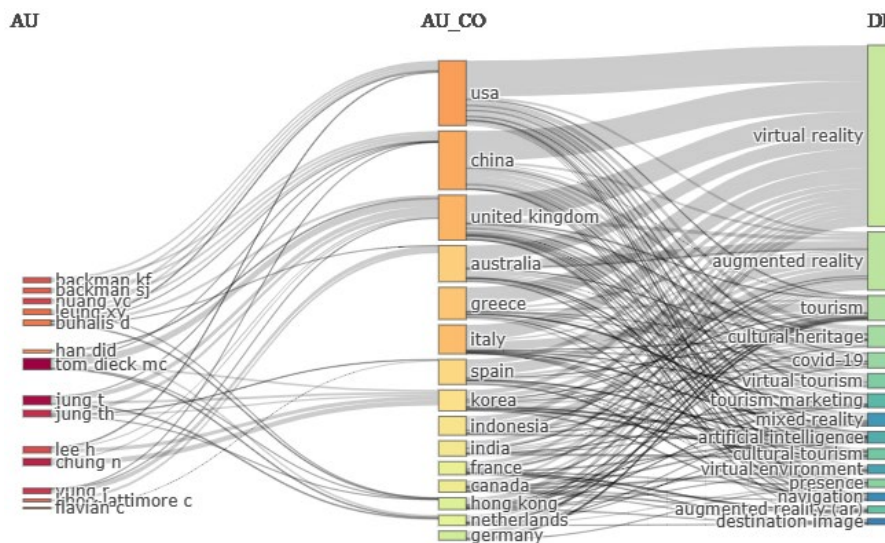


Figure 5: Three-Field Plots

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